

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

FOREST INSECT CONDITIONS

LASSEN NATIONAL FOREST

SEASON OF 1931

by

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Berkeley, California
February 9, 1932

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FOREST INSECT CONDITIONS
LASSEN NATIONAL FOREST
SEASON OF 1931

Introduction

General extensive observations of large areas within this Forest indicate that there are no evident epidemic centers of infestation this season, but that certain areas are showing upward trends or are being subjected to heavy losses from sustained endemic infestations.

Apparently, when some of the areas were viewed topographically from a distance, there was little insect loss to be seen; but a more intensive examination in those areas showed that heavy endemic losses, which should have been more conspicuous, had been present the previous season and were continuing in 1931. The answer to this lack of visible infestation was found in the fact that the 1930 insect-killed trees, which would ordinarily have been seen from a distance as "red" trees, due to the retention of a large portion of their foliage, had lost practically all the red, dried needles, and thus were not conspicuous. This had the effect of reducing the visible number of infested trees to those of the 1931 season only, as the trees attacked before that time were "black" and thus inconspicuous at a distance. The loss of needles on 1930 insect-killed trees and the sudden fading of the needles on 1931 summer killed trees to a foliage phase ordinarily characteristic of trees killed by brood of the preceding season gave the impression that the infestation was subsiding. Survey data, however, indicated that this was not always the case, as some areas showed slight increases in the infestation to have occurred this season.

Areas Surveyed in 1931

Areas in the Lassen National Forest that were subjected to surveys of a more intensive type are outlined on the map accompanying this report. The Eastern Lassen Working Circle was given an intensive cruise, in order to secure quantitative data for comparison with those obtained by the survey of the same area in 1930. The timber in the area west of the Eastern Lassen Working Circle, south of Black's Mountain Range and east of the Butte Creek Lava Rim was given a less intensive type of examination. The area north of Black's Mountain, Harvey Mountain Range, and extending east to Slate Mountain, west to the Pitville-Susanville Road and north to the northern boundary of the National Forest, was also examined. In all about 345,000 acres of land were covered by the surveys in the northeastern portion of the Forest.

In addition, more extensive and general observations were made in the east-side type of forest in Willard Chance near Fredonia Pass, and in the west-side type along the Red Bluff Road from the western Forest boundary to the southern boundary near Chester.

Eastern Lassen Working Circle

The Eastern Lassen Working Circle comprises a tract of uncut timbered land in Townships 43 and 44 North, Ranges 8, 9 and 10 East, containing about 76,000 timbered acres out of a total of about 115,200 acres. The area has been arbitrarily divided into seven units; i.e., Crater Mountain, Harvey Mountain, Logan Mountain, Gordon Creek, Cave Mountain, McCoy Flat and Brockman Flat. Of these the Logan Mountain Unit is almost entirely cut over, and a part of the eastern Crater Mountain Unit has been logged this past season by the Fruit Growers' Supply Company, to whom the timber is under contract.

For information concerning topography, timber cover and composition of the stand in this area consult the report of the 1930 quantitative cruise¹.

Past Infestation

All the data available in reports of qualitative examinations made prior to 1930 show that heavy endemic infestations in parts of the working circle have existed for some time. The following statements were made concerning the infestation in the report of the 1930 survey:

"The infestation in general shows a slight tendency to increase, but is of the balanced endemic type with smaller local areas experiencing heavier losses and exhibiting epidemic conditions. The western pine beetle and the Jeffrey pine beetle cause the more important losses.

"The annual losses for 1929 and 1930 over the greater part of the area were less than 0.5 per cent of the stand. Smaller areas in nearly all units experienced losses of from 0.5 to over 2.0 per cent.

"One group of areas, chiefly in the Brockman Flat and Cave Mountain Units, shows an infestation involving about 2.0 per cent of the stand. Apparently the insects are not attacking vigorously in these areas, but are favored by the poor conditions for tree growth.

"The Harvey Mountain Unit contains areas in which unstable conditions exist. Losses are near 2.0 per cent of the stand, and they have been occurring at the same rate for some time. The infestation has many of the characteristics of an epidemic, is increasing and spreading, and should receive some attention."

¹Salman, K.A. Survey of Insect Losses, Eastern Lassen Working Circle, Lassen National Forest; Dec. 9, 1930. File Typescript.

Survey Methods

Five half-section check areas (1600 acres) in typical stands were cruised to secure data on the 1930 infestation complementary to those obtained in 1930, and to secure the 1931 infestation that had appeared by the time of the cruise, in order to provide a basis for 1931 estimates.

In addition to the plots, 22.5 miles of 5-chain traverse were run, covering 900 acres, and counts were made on 30 miles of road strip, 10 chains wide, covering 2400 acres. The area covered by all types of survey constitutes 6.4 per cent of the total timbered area. The samples were chosen to give a cross section of conditions within the working circle.

Results of 1931 Cruise

Table 1 shows the losses that have occurred on the cruised plots, the basis for the figures being data secured during the cruises of 1930 and 1931. Slight decreases in the amount of infestation are shown on three of the plots, while two--those in the Gordon Creek and Brockman Flat areas--showed marked increases.

There are no areas that can be considered as having epidemic infestations. The Harvey Mountain area, however, continues to suffer the heavier losses, as does the Brockman Flat area, in which an infestation somewhat comparable to the type reported this year on the Modoc National Forest is apparent. In the Brockman Flat area, which for the most part contains fringe-type timber growing on rough lava beds, the infestation has shown a tendency to group, and the attack and brood of *D.brevicornis* appears to be vigorous. The Cave Mountain area, particularly that portion of the stand which can be considered as fringe type and which grows on the rough lava flows, also sustained an increased infestation in 1931. The areas of heavier infestation remain localized, and in most cases are apparently to be considered due to poor growth conditions rather than to vigor of insect attack.

Although the 1931 plot cruises in general show a slight decrease in the infestation, the strip cruises and road strips are consistent in showing an increase. The impressions gained from extensive observations of the area substantiate the traverse and road-strip data and average loss figures, weighted according to the area covered by each type of cruise, also show a slight increase. Estimates for the entire working circle, expressed as losses for each of the seven units, are given in Table 2.

Recommendations

In view of the existence of what may be termed a sustained endemic infestation throughout practically the entire Eastern Lassen Working Circle, and in view of the fact that heavier centers of infestation which in no case may be termed epidemic are local, scattered, apparently confined to relatively small areas and possibly correlated with unfavorable site conditions, it is felt that the recommendations of 1930 are sufficient to cover the situation.

These recommendations consider the cutting of the timber on the south slopes of Harvey and Ashurst Mountains in the near future, and subsequent cutting of other areas in which the endemic infestation is causing the more serious losses.

As an increase and a type of infestation showing some epidemic tendencies have appeared in the Brockman Flat Unit, it is recommended that this and surrounding areas be closely watched in order to detect the development of serious epidemic conditions that might affect nearby timber stands.

Butte Creek Rim Area

A more extensive type of reconnaissance was made in this area than in the Eastern Lassen Working Circle in order to extend our general knowledge of the bark beetle infestations in the yellow pine-Jeffrey pine type of stands in the Lassen National Forest.

The area outlined on the map accompanying this report contains approximately 115,000 acres, and several distinct types of stand occur within its boundaries, as follows:

The Black's Mountain Basin includes the well-timbered lands west of the Cone Mountain Range, south of the ridge connecting Cone, Patterson and Black's Mountains, east of a line from Black's Mountain to near Halls's Flat Ranger Station, thence approximately south along the range line between Ranges 6 and 7, and east to and including the yellow pine type west and to the north of Bogard Buttes in Township 32 N, Ranges 6 and 7 E.

The stand in this unit, while not uniform in type, being broken up by rather large valleys and including stands on poorer sites, contains the greater portion of the mature stands of better-quality timber. In the basin south of Black's Mountain and extending to Poison Lake and Gary's Valley the stand is clearly a mixed yellow pine-Jeffrey pine stand, while that west and north of Bogard Buttes is predominantly yellow pine.

A second subdivision of the Butte Creek Rim Area includes the timber growing in the Butte Creek Basin and in general extending north from the north boundary of Lassen National Park to near Jelly Camp. The stand on this area, when consisting of mixed yellow and Jeffrey pine, is peculiar in that there are to be found only scattered mature trees, pole-sized trees forming the greater portion of the forest cover. Near Long's and along Butte Creek there are extensive openings in the forest, and scattered areas of lodgepole pine occur.

A third subdivision consists of the more fringelike type of timber, growing in general in the area northwest of Jelly Camp.

These divisions are the result of an attempt to separate the area into entomological units, for there are no clearcut natural boundaries; yet the stands on the subdivisions described above evidently have different entomological possibilities. Before detailed quantitative cruises of this area are attempted, an examination of the various types of forest cover should be made and more definite and suitable boundaries selected for the units.

History of the Infestation

So far as is known, very little information is available concerning past infestations in this area. In 1930 observations indicated that endemic infestations existed in the yellow pine-Jeffrey pine stands, while there was evidence that the scattered areas of lodgepole along Butte Creek were suffering from relatively heavy infestations by the mountain pine beetle (*Dendroctonus monticolae* Hopk.), and evidence was present that losses in these areas had been heavy for some time past.

Survey Methods

Two 320-acre plots were cruised in the Black's Mountain Basin as a part of the Eastern Lassen Working Circle cruise. In addition one strip cruise 4 miles and 25 chains in length (172 acres), 46 miles (3,680 acres) of road strip 10 chains wide, and 4 miles and 25 chains (172 acres) of strip count were run.

Present Infestation

The following results were secured from the plot cruises:

<u>Location of Plot</u>			<u>Area</u>	<u>1930 Losses</u>		<u>1931 Losses (estimated)</u>	
<u>T.</u>	<u>R.</u>	<u>Sec.</u>		<u>Trees</u>	<u>Vol. B.M.</u>	<u>Trees</u>	<u>Volume B.M.</u>
33 N 8 E		7	320	18	23,050	41	46,600
33 N 7 E		17	320	13	13,390	33	28,600

The results of the strip cruise run on Cone Mountain are as follows:

<u>Year</u>	<u>Trees</u>	<u>Losses per Section</u>
		<u>Volume B.M.</u>
1930	11	11,390
1931	37	43,480

In the above figures, the increase in the number of 1931 trees over the number of 1930 trees is perhaps not so pronounced as is shown. In "spotting" the infested trees considerable difficulty was encountered in recording the 1930-brood trees, due to their rapid deterioration. The spotters no doubt missed some of these trees in the belief that they were killed prior to the summer of 1930.

The average number of trees killed per section, as shown by the road strips and strip count, was 17 for 1930 and 15.7 for 1931. The estimated total losses for the entire area of 115,000 acres, based upon the above data weighted according to the area sampled, are as follows:

<u>Year</u>	<u>Per Section</u>		<u>Entire Area</u>		
	<u>Trees</u>	<u>Vol.B.M.</u>	<u>Trees</u>	<u>Vol.M.B.M.</u>	<u>Value</u>
1930	19	21,505	3,366	3,870	\$15,480
1931	25	24,650	4,410	4,436	17,744

The greater portion of the losses in this large area is due to the western pine beetle attacking western yellow pine; and losses in Jeffrey pine caused by the Jeffrey pine beetle take second place in importance. Generally speaking, the infestation throughout the area may be considered to be in an endemic condition, for the tendency to group and to attack immature and thrifty trees is not exhibited to any marked extent.

In the Black's Mountain Basin losses may be considered about normal, heavier losses being suffered in the stands on poorer sites. No particular centers of infestation were noted. In the Butte Creek Basin the yellow pine-Jeffrey pine stands in the vicinity of Hall's Flat Ranger Station did not appear to be suffering any important losses, but a small center of infestation in Jeffrey pine was found near the north boundary of the Lassen National Forest.

The infestation in the third subdivision, the fringe type of stand in the northwestern portion of the area, caused heavy losses in some parts of the timbered area, and the large number of snags of both old and recent kill indicate that this type has been suffering from relatively heavy infestations for some time. One area, roughly covering Sections 35 and 36, T 35 N, R 5 E, and Sections 1 and 2, T 34 N, R 5 E, showed an extremely heavy endemic infestation, which in amount of loss borders on the epidemic. As this infestation appears to be the result of unfavorable growing conditions--for the area is on rough land and near the margin of the yellow pine belt of the area--and as the stand is not of high quality nor likely to be harvested in the near future, it does not seem advisable to recommend control. The necessary maintenance control measures that would have to follow the initial control operation would make such a program unprofitable.

Recommendations

The infestation in the area covered by this report does not in general appear to be at a critical stage. The lack of data concerning the area, however, makes it impossible to come to any sure decision regarding the trends and capabilities of the infestation. The first thing that should be done if the conditions are to be properly evaluated is to secure a general working knowledge of the varied types of stands and conditions of growth in the area, and the second is to select a number of check areas from which quantitative data can be secured and which will efficiently sample the stand and infestation. Accordingly these observations and selections should be made at the earliest possible opportunity, and the check sections chosen and incorporated in the regional survey system.

As no critical situation exists, it is not recommended that any control measures be considered at the present time.

Dixie Valley Area

This area includes the timbered lands within the Lassen National Forest lying to the north of the ridge extending westerly from Slate Mountain through Dow Butte, Ashurst, Harvey and Patterson Mountains to Black's Mountain. The western boundary of the area is considered to be the Pitville-Susanville Road. The area contains about 116,500 acres, a large portion of which is privately owned.

There are no distinct entomological units in this area having either natural topographic or type boundaries, although there are marked differences in type of stand and of infestation within the area. The entire area is on a northward-sloping watershed of the Pit River drainage basin. The timber along the southern boundary and in the southeastern portion of the area is growing at higher elevations, and consists largely of a mixed-conifer stand of yellow pine, Jeffrey pine, some sugar pine and white fir. To the north and in areas at lower elevations the stand is a mixed yellow pine-Jeffrey pine type of good quality. The quality, however, becomes progressively poorer north of this belt; and as the margin of timber type is approached the stands become more open, of poorer growth, and show all the characteristics of a marginal type.

Survey Methods

No plots were cruised, and therefore no quantitative data regarding number of trees and actual volume lost on any measured area are available. This makes it impossible to do more than estimate the apparent number of trees killed in the area, using as a basis the data from 49 miles (3,920 acres) of road strip.

Infestation

According to the data secured from road strips, the infestation in this area has in general subsided slightly. The figures of average number of trees lost per section are estimated as 17.6 for 1930 and 14 for 1931, the estimated total number of trees lost on the entire area being 3,200 for 1930 and 2,550 in 1931. These figures are probably much lower than the actual loss suffered by the area, but are of value in that they indicate the relation of the 1931 infestation to that of 1930. However, the difference between the infestations of the two seasons, as well as those variations found in the Butte Creek Rim Area and in parts of the Eastern Lassen Working Circle are so slight as to make it impossible to recognize their significance. It is evident that no marked changes are visible in the infestation at the present time, and in general it is considered as normal and endemic.

Past infestations in the more fringelike type of timber and in those stands growing on the poorer sites have resulted in the leaving of numbers of snags. It is believed that these snags are the results of normal losses in stands composed of trees weakened by unfavorable growing conditions rather than by vigorous insect attack.

Recommendations

As no tendencies that can be considered of any great significance are evident in the meager data collected from this area, no recommendations for action are considered necessary. More intensive survey methods, however, should be extended to cover this area, in order that the information concerning the infestation may be more reliable.

Willard Chance

This area, which consists of the Willard Creek drainage basin near Susanville, was seen but was not given an intensive examination. The infestation has apparently shown a slight increase within the past year, but it is not believed that the present infestation shows alarming tendencies.

West Side Type

Observations made along the Red Bluff-Susanville highway from the western boundary of the national forest to near Chester failed to disclose any infestation of importance. Relatively few insect-infested trees were seen along the route or in basins visible from the highway, and it is thought that the general region in the vicinity of this road can be considered as supporting infestations of a normal endemic nature.

Summary

Approximately one-quarter of the total area included within the boundaries of the Lassen National Forest was covered this season by surveys of a more or less intensive nature. The areas worked are indicated on the accompanying map, and are designated as the Eastern Lassen Working Circle, the Butte Creek Rim Area and the Dixie Valley Area. In addition, general observations were made in other parts of the forest.

In no case were epidemic conditions found to exist in any portion of the areas examined. In and near Brockman Flat, in the Eastern Lassen Working Circle, evidences of increase were marked, and the tendencies shown by the infestation indicated incipient epidemic conditions. Throughout the remaining area cruised this season a slight increase was evident for the most part; but it is not considered that definite tendencies denoting either important increases or decreases are indicated. It is apparent that the 1931 infestation shows the existence of a more or less stable situation, and that normal endemic losses are suffered by those portions of the area bearing better-quality timber. Local smaller areas exist in which losses that may be considered of a heavy endemic type occur. Perhaps peculiar environmental conditions, making for unfavorable growth conditions for the timber or favorable conditions for the beetles, are the cause of these spotted infestations. The fringe type of timber also showed heavy endemic losses, but this also is apparently due to unfavorable conditions.

No recommendations for action appear necessary to cope with the present infestation, as the plans for salvaging timber in the more heavily infested portions of the Eastern Lassen Working Circle provide for the necessary modification of logging operations.

TABLE 1

EASTERN LASSEN WORKING CIRCLE
PLOT LOSSES, 1929-1931

Unit	Location				Acres	1929			1930			1931*			
	Tp.	R.	Sec.	Part		Volume	No.	Volume	%	No.	Volume	%	No.	Volume	%
	N	E	Sec.			M.B.M.	Trs.	B.M.	Stand	Trs.	B.M.	Stand	Trees	B.M.	Stand
Crater Mt.	32	8	21	W $\frac{1}{2}$	320	4,709	10	6,910	0.15	30	38,230	0.81	26	29,830	0.63
Harvey Mt.	33	8	24	N $\frac{1}{2}$	320	3,487	56	65,170	1.37	40	43,390	1.24	30	36,600	1.05
Ashurst Mt.	33	9	10	S $\frac{1}{2}$	320	5,391	21	19,550	0.36	66	54,170	1.00	40	38,230	0.71
Gordon Creek	33	10	9	W $\frac{1}{2}$	320	5,045	13	9,710	0.19	11	13,890	0.28	20	25,200	0.50
Brockman Flat	32	10	28	E $\frac{1}{2}$	320	4,328	16	13,590	0.31	35	28,830	0.67	59	41,570	0.96

* 1931 losses estimated; cruised losses considered 70% of total

TABLE 2

ESTIMATED LOSSES, 1929-1931

Unit	Acres*	Vol. Stand: MBM**	Av. Vol.: per Tr.	1 9 2 9			1 9 3 0			1 9 3 1		
				No. Trs	Vol. MBM	% Stand	No. Trs	Vol. MBM	% Stand	No. Trs	Vol. MBM	% Stand
Crater Mt.	17,900	217,699	1,020	700	756	0.35	890	961	0.44	853	963	0.44
Harvey Mt.	21,660	276,406	990	1,400	1,396	0.50	1,650	1,634	0.59	1,684	1,671	0.66
Gordon Creek	7,280	120,511	1,230	310	381	0.32	360	445	0.37	440	568	0.47
Cave Mt.	10,460	84,457	750	580	435	0.51	520	390	0.46	608	461	0.55
McCoy Flat	5,960	64,099	750	300	225	0.35	430	255	0.40	315	242	0.37
Brockman Flat	11,740	82,452	975	390	380	0.46	520	505	0.61	818	808	1.00
Logan Mt.	1,000	13,412	800	50	40	0.30	70	56	0.42	54	44	0.33
Totals	76,000	859,036		3,730	3,603		4,440	4,246		4,772	4,757	
Averages			940			0.40			0.46			0.55

* Timbered area

** Volume of stand at beginning of 1929 season

